



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

BOOK REVIEWS

The Psychology of Number and its Applications to Methods of Teaching Arithmetic. By JAMES A. McLELLAN and JOHN DEWEY.
New York : D. Appleton & Co., 1895 ; pp. 309 + xiv. \$1.50.

It is very strange that, although arithmetic is taught more extensively than any other subject in the primary and secondary schools and so unacceptably at that, we see so little respectable literature upon the pedagogy of the subject. It is true that the educational journals devote any amount of space to articles upon the teaching of arithmetic, and that elementary text-books are numerous enough to satisfy all tastes, but the former are devoted almost exclusively to thrashing old straw, and the latter are only temporary in their influence. Indeed there has never yet appeared in English or in French a masterly work upon the subject by itself ; Duhamel's great treatise on method contributes nothing as to the first steps, and the same may be said of the excellent *Méthodologie Mathématique* by Félix Dauge, of which the second edition is just out. In German the reverse is the case ; indeed there has possibly been too much written in that language ; at any rate it is to the "home of philosophy" that we have been compelled to go in this century for almost all of our pedagogy.

This work by Principal McLellan and Professor Dewey will therefore be cordially welcomed by all English-speaking teachers as a herald of progress in the pedagogy of arithmetic. It matters not so much whether one believes in the book, whether he considers its positions tenable, its matter new, or its discussions judicious ; it is enough that it is written by strong men, by men with convictions, by teachers who claim a psychological warrant for their utterances, and by writers who make their readers think.

The book is a protest, and a vigorous one, against three patent and deep-rooted evils. The first is the English, or one might say the mediæval, notion of teaching numbers as symbols and of memorizing unnecessary rules and definitions. The second is our present degenerate form of Pestalozzianism, a system that was founded on the rational principle that objective teaching, perception, should be the foundation but should not constitute the entire structure of education in number. The influence of the great Swiss schoolmaster was not slow in reaching

this country, where it contributed much toward the elimination of mediævalism, and the introduction of rational method. But the system has lacked a sufficient number of strong supporters and it has degenerated by the influence of unscientific minds, until our American schools have only a haphazard way of teaching arithmetic that is universally admitted to be a failure. The third evil that the book combats is the evil of Grubeism, a craze that may be called a mere freak of American pedagogy. It seems odd that two American teachers should have happened on one of a large number of German *Leitfaden*, one that was not very prominent, nor very recent, nor very good, and by translating it inflict it on our schools as the best exponent of German pedagogy.

The work opens with a chapter on "What Psychology can do for the Teacher." Six chapters follow on "The Psychical Nature of Number" and kindred topics, after which the subject of "The Primary Teaching of Number" is introduced. Some eighty pages are devoted to primary arithmetic, the remaining seventy having to do with the work of the grammar school.

After emphasizing the value of psychology the authors proceed to seek the psychological origin of number, and find that "Number arises in the process of exact measurement of a given quantity with a view to instituting a balance, the need of this balance, or accurate adjustment of means to end being some limitation." This forms the basis of one feature of the method which they suggest. They divide the older methods into two groups, (1) the method of symbols, the mediæval inheritance, (2) "the method of things, of observing objects and taking vague percepts for definite numerical concepts which treats number as if it were an inherent property of things in themselves, simply waiting for the mind to grasp it to 'abstract' it from the things. . . . Number is not (psychologically) got from things, it is put into them." The method suggested by the writers, and hence called "The Rational Method," is described as that "which develops numerical ideas in connection with the construction of some definite thing, bringing out clearly (a) the natural unity, the limit (the magnitude) to which all number refers; (b) the unit of measurement (the particular thing) which helps to construct the whole; and (c) the process of measuring, by which the second of these factors is used to make up or define the first, thus determining its numerical value." "The unit is never to be taught as a fixed thing (*e. g.*, as in the Grube method), but always as a unit of measurement."

It must be confessed that neither the authors' objection to the method of objects nor their two distinguishing features of "rational method" are new, which of course does not militate against their present value. Knilling, writing a dozen years ago, waged serious warfare against the "method of objects." "Keine Zahl wird aus der blossen Anschauung erkannt; kein Rechenergebnisz durch blosser Anschauung gefunden," etc. (*Zur Reform des Rechenunterrichts* p. 23). The "fixed-unit" method was so seriously attacked by Pestalozzi that his $2 \times 3 + 3 \times 3 = (?) \times 3$ became a serious mannerism. The introduction to number through measurement, and the opposition to the fixed unit, is also ably championed by Knilling (p. 31, et pass.) and by other writers of the past decade.

In spite of the good that the work contains, its earnestness in combating mere formalism, its general mathematical accuracy (some inaccuracies of statement have crept in, as on p. 258), and its psychological basis, one lays it down with a slight feeling of disappointment. As the weeks elapse this feeling grows, and one queries, What does it lack?

It is difficult to answer this question. To be sure the work is often prolix; certain chapters lack in methodical arrangement; nor is it a book that is likely to be a guide to primary teachers, the very ones who most need its influence. Then too, the work entirely ignores the historic growth of number-method, a thing that we have no right to demand, to be sure, but a feature that would have been of utmost value to teachers. A few pages on the evolution of method, say from Busse at Dessau, through the great Swiss teacher, through Tillich and Stephani and Diesterweg, through Grube and his small following, down to Tanck and Knilling and the writers of our time—such a chapter would have been very valuable. Were this followed by a clear exposition of the excellencies and the defects of each, from the standpoint of psychology, the teacher would have a far better understanding of the subject than the book gives. Indeed, when one summarizes his criticisms they perhaps reduce to this: As compared with works like Knilling's or Hartmann's or Jänicke's, or Räther's, or Dittes', it is wanting in definite results that the primary teacher can use; and as one thinks of Sterner's *Geschichte der Rechenkunst*, or Unger's masterly work, *Die Methodik der praktischen Arithmetik*, the absence of the historic view is to be regretted.

DAVID EUGENE SMITH

MICHIGAN STATE NORMAL SCHOOL,
Ypsilanti